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HISTORIC SKETCHES

THE
OLEAN ROCK CITY

THE BRADFORD
OIL DISTRICT

OLEAN and
BRADFORD

A COMMUNITY
FRUIT and NUT GROVE

KATHERINE EATON BRADLEY



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SKETCHES

THE OLEAN ROCK CITY

HISTORIC GLIMPSES OF
OLEAN, NEW YORK

THE BRADFORD OIL DISTRICT

HISTORIC GLIMPSES OF
BRADFORD, PENNSYLVANIA

KATHERINE EATON BRADLEY

1920

Olean, New York.

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THE OLEAN ROCK CITY.

IT may be that the surveyors who laid out the Kittanning Road during the War of the American Revolution were the first white men to gaze upon the glittering pebbles of the huge conglomerate rocks now called the Olean Rock City. This military highway, cut through the forest one hundred and forty years ago, passed near these rocks, and its builders must have asked the question, "How and when were these immense boulders scattered upon the hill-tops?" This remarkable group of rocks, situated in the northern portion of the Bradford Oil District, is perched upon a ridge of the Great Divide of the Alleghany Mountains, one thousand feet above Olean, in southwestern New York. It is six miles south of the city and near the New York-Pennsylvania boundary. The group is an isolated fragment of a layer of rock which has been given a variety of names. It is called the Olean Conglomerate because of this bold outcrop at the Olean Rock City; the Great Conglomerate; Farewell Rock; and Puddingstone. In Ohio, it is known as the Sharon Conglomerate, and in England, as the Millstone Grit. Between 1836 and 1840, three geologists connected with the first New York geological survey visited the

rock cities of the state. Mr. Horsford described the large rock city seven miles south of Ellicottville as the locality most visited, and as being in the highest degree imposing. He also mentioned similar boulders at Chipmunk Riffle, and a group in Alleghany County. Professor James Hall said of the group near Olean, "To these broken outliers of conglomerate the fanciful name of 'Ruined City,' has been applied; the broad fissures resemble streets, and the huge rocks on either side dilapidated houses. There are subterranean passages and courts, now the abode of bears and wolves."

In the corner stones of these houses is no information as to how or when they were built, but on their walls the eye of the geologist finds their history plainly written. At Rock City "though inland far we be," we are near the shore of what was once the great Carboniferous Ocean. Its thundering waves wore down the primitive rocks into sand and mud, and on its beaches were rolled the white and gray quartz pebbles of the conglomerate boulders, pebbles ranging in size from a pea to a goose egg. The pebbles and sand, gradually settling upon the ocean's bed, made a layer varying in thickness in this locality from thirty to two hundred feet. Near Lehigh, Pennsylvania, this stratum has a thickness of fifteen hundred feet. The bottom of the stratum is always composed of larger pebbles than the

upper portion, showing that the materials were carried in water, the heavier portions sinking first. Mother Nature stirred up a mixture of sand, pasty mud and pebbles, which from its appearance has been termed puddingstone. "Pebbly beaches now forming will when consolidated produce conglomerate."

In the dim past "when the morning stars sang together," the Great Conglomerate was long ages in being created, and was remarkable as the floor upon which were laid those deposits of incalculable value to mankind—the Coal Measures of the world. By the geologist's hammer and by borings for coal and petroleum, the conglomerate can be traced as it inclines from the surface of the ground at Rock City to a depth at Pittsburgh of three hundred feet, and at Wheeling, West Virginia, of seven hundred feet, with nine seams of coal resting upon it. It was necessary that there should be an elevation and a subsidence for every seam of coal. This rock is the best guide for the coal and oil prospector and he always keeps a record of its depth and thickness.

For a clear knowledge of the story of the rock cities we are indebted to the researches of Dr. Charles A. Ashburner, who conducted the Pennsylvania Geological Survey in this region in 1877. He has explained the conditions necessary to the making of rock cities. Before his time it was a popular be-

lief that the rocks had been brought from the north and dropped by melting glaciers and had been broken into their curious forms by earthquake shocks. These theories have been disproved by established facts. The ice sheet stopped in the center of the valley in which Olean is built, and did not extend as far south by several miles as Rock City. Regarding earthquake disturbances in this region the rocks tell a story of quiet upheaval. There is probably no region in Pennsylvania which has been affected less by earth crust movement than the northwest portion. Dr. Ashburner cites the Bradford oil sand as bearing testimony to this fact. It is found at an approximate depth of eighteen hundred feet, its wide spread sheet being remarkable for its evenness and regularity.

After the formation of the conglomerate, it quietly sank, probably not more than a foot in a century. It is probable that during the Carboniferous Age it had sunk forty thousand feet, and by the close of this period the rock was comparatively level. Then occurred the stupendous uplift of the Appalachian Mountain system, forcing up with it the Great Conglomerate with its precious load of coal lying on its breast. When it became stationary, its base at the Olean Rock City was 2,310 feet above present sea level. As to the force which throws up mountain systems, President Holland in

an address to the geologists of the British Association, within the past few months, made the statement that no one can answer the question as to whether they are thrown up from below by volcanic action, or are formed by the earth's crust rumpling up like a base-ball's cover when it loosens.

The scientists confidently assert that every coal deposit rests upon the Great Conglomerate, that coal in workable quantity is never found below it in any part of the world. It is called by both American and English coal miners "farewell rock," because when they have reached it, they take leave of all valuable fuel. Great fortunes have been lost and men have worked a lifetime in the vain effort to find coal below this stratum. A conspicuous example of the conglomerate beneath the coal is seen at Lookout Mountain, Tennessee. Sir Francis Lyell examined the conglomerate and the coal in England and in Pennsylvania, finding the same kind of fossil plants in the corresponding strata in both places.

Pennsylvania has virtually all the hard or anthracite coal in the United States; a region twenty by twenty-four miles would be large enough to hold it all. Professor Silliman years ago called it "a great national trust."

When first elevated this part of the country was as level as the prairie. What were the forces which carved out the valleys, leaving the rock-ribbed hills standing

“against the blue walls of the sky?” Science answers that rain, water and air were the chemists, and glacial action the sculptor. Only isolated fragments, like the rock cities, now remain of the conglomerate exposed above the ground, and they rest in blocks upon the highest summits. The form in which the rock is seen at Rock City—huge cubical blocks having vertical faces—is the result of the same agents which carved out all the valleys. The principal agent was flowing water filled with sediment. The agent which accounts for the peculiar form of the rock cities is the expansion due to the freezing of water which has entered fissures or seams in the rocks. As the rock mass contracted, principally in vertical planes, the seams occurred and the freezing water forced the rocks apart into mighty blocks and started a *straight* and *forward* movement. Evidence of this movement is that, although the fissures which separate the rocks vary in width, each fissure is generally of the same width throughout.

Up to this point no reference has been made to a most vital part—the foundation of this rock. It is underlaid by a bed of slate. If the slate was soft and crumbling, the conglomerate blocks above it were broken up, pushed off the hilltops, rolled down their sides, scattered about and the finer parts washed away. “They fell and great was the fall thereof.” A different tale

is told of the few fragments—the rock cities—which remain. Their foundation was hard slate forming a level bed upon which the conglomerate blocks could slide under the pushing force of freezing water. These blocks were pushed only a few inches or feet and retained their level. The reason they are standing today is vouched for by both Science and Scripture, “The floods descended and beat upon them, and they fell not, for they were founded upon a [hard] rock.” This was the usual occurrence. Other and minor causes of the breaking up of the rocks are sand driven by the wind, and the wedging off of blocks by expanding roots of trees.

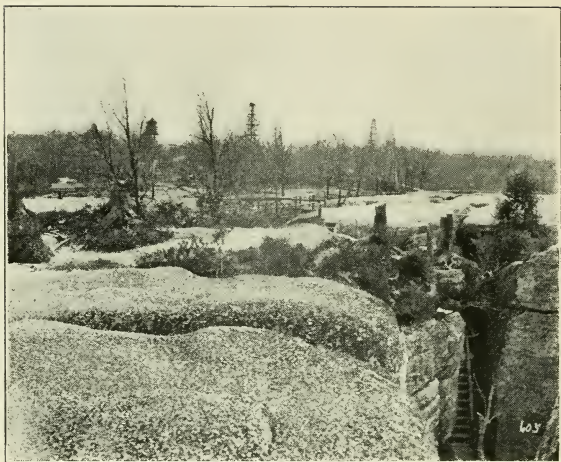
Great trees now grow upon them, they are often thickly covered with lichens, ferns and fern-like moss, and over their sides clamber vines. Among the notable masses scattered over this ridge are three fine groups; Little Rock City on the opposite side of the plateau from the “Big Rocks”; Flat Iron, which commands a view of majestic hills and beautiful valleys and of Olean spread out in its wide valley far below; and the Moore group, as yet unknown to the tourist, standing in quiet grandeur among towering forest trees.

There are eleven of the larger groups; New York has four all within a few miles of the state line, Pennsylvania has seven at intervals of twenty-five to fifty miles and

reaching to the Ohio boundary. They are proof that this stratum once existed still further north, and are silent witnesses to the stupendous destruction of the exposed conglomerate, of the coal above it, and of the materials resting upon them. Mr. James Macfarlane says: "It is certainly difficult to imagine what has become of the vast mountains of coal and conglomerate which have been removed and cast into the sea."

It would seem that the Mound Builders, whose densely populated communities were in this locality, and the Indian tribes who came afterward must often have hunted among the rocks, rested in Hunter's Cave, and lighted beacons on Sentinel Rocks. They may also have discovered in sultry midsummer, as do the excursionists of today, snow and ice in the deep gorges of the rocks.

In traveling from Olean to the rocks one may take the highway, which winds about the wooded hills, steadily rising through the narrow valley, or may go by automobile or electric railway. After leaving the cars of the Western New York and Pennsylvania Traction Company, a short walk on the plateau will find the visitors on the house-tops of the city; they must enter by descending the staircases, and unless sufficiently slender they may be caught in "Fat Man's Misery." The "Three Sisters" will direct them to an easier route to "Table



THE TOP OF THE ROCKS



THE THREE SISTERS

Rock" where they may unload their lunch baskets. Soon the fragrance of coffee simmering over an open fire will mingle with the sweet breath of the woods and with that atmosphere of joyous freedom which distinguishes city-dwellers when they find themselves in God's great out-of-doors.

The tourist prefers to come either when this country is all aglow with gorgeous autumn foliage, or when it is "knee-deep in June." In that month the laurel is in bloom, its exquisite pink clusters and glossy evergreen leaves making a striking setting for the white boulders. In sunny places the flowers are rose color; in the deeper woods they are white. The fluted buds are more beautiful than the blossoms. This shrub and the hazel invariably indicate the presence of the conglomerate rock. In ascending a hill capped by conglomerate, we see laurel and hazel first at the slope formed by the bottom of the conglomerate. Fortunate it is that the laurel grows luxuriantly at Rock City, or long ago it would have been exterminated. During its season, groups of people are seen every hour of the day coming from the rocks, their faces almost hidden by their armfuls of laurel boughs. One is reminded of the army carrying boughs, which was seen by the messenger to Macbeth: "As I did stand my watch upon the hill, I looked toward Birnam and anon me thought the wood began to move. You may

see it coming ! I say—a moving grove.” To quote only a few words from Henry Van Dyke’s brilliant tribute to the laurel: “I have seen the flame azaleas of Georgia, * * the imperial blossoms of the rhododendrons, * * the tulip beds of Holland, * * the rose gardens at Kew, * * but never have I seen bloom more lovely, more satisfying to the eye, than that of the high laurel.”

After losing the glory of their mighty pines and hemlocks and being deprived of sufficient seedlings to reproduce them, the mountains girded up their loins and patiently labored to produce a new forest of cucumber, oak, chestnut, beech, birch, maple, hickory, butternut, wild apple, pin cherry, and many other trees, and in addition, a great variety of shrubs, vines, berry bushes, and blooming plants,—all so dear to the heart of every lover of nature.

In the hot months there is often a thick fog in the valleys, on which occasions the break of day on the hill-tops is a wonderful sight. A soft radiance floods the higher elevations in sunshine, while the valleys appear to be a sea of billowy fog. The peaks of the smaller hills are islands, the white breakers roll upon the shores, where one is sure he sees tall tapering light houses. Later he realizes that they are at least doing their bit to make light houses, as they prove to be the derricks of the oil and gas wells. There is a recreation park at Rock City;

and along the trolley line are oil country towns, summer camps, and cottages, and attractive permanent homes. The altitude is higher than that of Lake Placid in the Adirondacks. Two sanitoriums invite the health seeker to sojourn in the dry and invigorating atmosphere — *Rocky Crest* near Rock City, and *Bon Air* at Bells Camp near Bradford. A day camp for anaemic children is also near Rock City. Associated with the rocks are two short stories written by the late Fred Lockwood Eaton of Olean, which appeared in "The Youth's Companion." The scenes in "Sentinel Rock" are laid at Rock City, and the "Sleeping Courier," published September 1, 1898, has its setting at Flat Iron Rock.

HISTORIC GLIMPSES OF OLEAN.

WHEN the great ice sheet came down out of the north, its towering front advanced no further south at this point than the present location of Olean, New York. It was nearly as high as the hill to the south of the city, Mount Hermance, whose face and that of Homer Hill to the north, were ground off by the moving glacier. The steep scarred faces of these hills are now covered with young woods. The melting glacier left its mud, sand, and boulders lying all across the valley in which Olean is situated. The elevation of Oak Hill Park and the site of the high school building are composed of portions of the debris of this terminal moraine which is piled up from Putnam street to Whitney avenue, to the steep bluff north of Reed street, and to Sullivan Hill and Seventh street. A few miles up the Alleghany River are markings high on the hillside indicating the location of a dam made by blocks of glacial ice.* This dam must have thrown a deluge of water in the rear of Mount Hermance.

As we leave the glacial epoch and come down to a later period of time, we find that

*Note: Olean Natural Science Society, Olean Herald, April 14, 1896.

Cattaraugus county had very extensive remains of the earthworks, fortifications, and burial mounds of pre-historic peoples.* There is evidence that ancient man and the elephant lived at the same period at the head waters of the Alleghany River, relics which seem to prove this statement having been discovered in Cattaraugus County in the great valley of the Conewango River. Large molar teeth of the elephant have been found. Near Red House valley was discovered one of the most interesting relics of the ancient inhabitants,—a flat piece of copper about four by six inches in size on which was engraved an elephant in harness.

It is considered that Olean was once densely populated by the Mound Builders, and that Randolph was also the site of a pre-historic city. The line of the Genesee Valley Canal in East Olean passed through a burial mound containing human bones, which upon exposure to the air, crumbled to ashes. This oval mound was sixty feet long, forty feet wide, and ten feet in height. It is known that the mastodon was contemporary with the Mound Builders, and naturally a deep interest attaches to the finding of a mastodon's tooth in a swamp in East Olean. This tooth is now in the possession of Mr. J. F. Johnson of Hamilton

*Note: History of Cattaraugus County, Adams, 1893.

street, on whose land it lay buried. When Europeans first visited this part of the world it was occupied by tribes of Indians. Although the Erie tribe was the most powerful in this locality, it was exterminated by the Iroquois. The oil spring near Cuba was so highly prized by the Seneca tribe that it was never traded to the white man. In the treaty with Robert Morris, the square mile of land surrounding the spring, "Dripping Oil," was made a reservation to which the Indians still retain title.

THE OLD KITTANNING ROAD.

One of the few links connecting this locality with the period of the War of the American Revolution is the Kittanning Road. One hundred and forty years ago a swath was cut through the unbroken forest in a southwesterly direction from Olean to Kittanning on the Alleghany River, forty-four miles north of Pittsburgh. The road was constructed for military purposes, probably with the idea of providing a connection by land with Pittsburgh should river communication be cut off by the British. Kittanning is in Armstrong County, and its military defenses consisted of Fort Armstrong, built in 1779, and two block houses which furnished a refuge for the settlers when apprehensive of an attack by Indians. At the southern end this historic highway has been known as the Olean Road, while

at the other end it was called the Kittanning Road. Kittanning Avenue in South Olean covers nearly the same route for some distance up the Wildcat Valley.

From Olean the road climbed a thousand feet in its first few miles, and passing near those picturesque groups of rocks—Flat Iron Rock and the Olean Rock City—it reached the crest of the Great Divide of the Alleghany Mountains. By an air line the distance between the two terminals was more than one hundred miles; but the road covered a greater distance, as it followed the winding course of the ridges of the continental divide. Near State Line, at Bradford and other places, parts of this highway are to be seen; and at Kane, Pennsylvania, were found cannon, remnants of fortifications, and other relics of military occupation. On the table-land at Rock City are the huge stumps of the pine trees which were felled to make through the forest a pathway for the defenders of their liberties. We may picture our Revolutionary sires working in the pure invigorating air of the mountains as the sound of the axe and the crash of falling monarchs of the forest reverberated among the rocks.

The military records at Washington covering the history of this road were, it is thought, destroyed by the British during the War of 1812. There is an unconfirmed

tradition that the route was laid out by General Washington.

THE FOUNDING OF OLEAN.

Oil creek, whose source is the Seneca oil spring, is a tributary of a creek which was given the name of Olean by Major Adam Hoops. This stream by its junction with the Alleghany River forms the point of land selected by Hoops for a settlement which he referred to as the "Mouth of Olean," and which later was termed Olean Point. Doubtless the name of Olean—from the Latin *oleum*, meaning oil—was suggested to the mind of the founder of Olean by the neighborhood of the oil spring near the village of Cuba. Major Adam Hoops was a Revolutionary soldier whose nephew had been a surveyor in this section and had probably called his uncle's attention to its advantages. Major Hoops thought that the "Mouth of Olean" was destined for prosperity, that it would be the head of navigation on the river, and a place for the embarkation of emigrants. He bought twenty thousand acres of land of the Holland Land Company in 1803, came the following year, and established a settlement in the midst of the wilderness. Here was the "forest primeval." The hills and vales of Cattaraugus county were clothed with a magnificent white pine forest. The trees stood in close ranks, the largest of them towering

to a height of two hundred and forty feet, and having a circumference of eleven feet. Mr. Henry Barr, a native of Olean, told the writer that when a lad he had often climbed into the trees in the cemetery, (now Oak Hill Park) and going from tree to tree had not descended to the ground until reaching Union street. At the junction of creek and river where the pre-historic men had their sepulchral mound, where the Indians set up their wigwams and chipped their stone weapons and implements, was built the first home of the white man, the cabin of Robert Hoops, the brother of the founder of the place. Deer and other game were abundant as were also ferocious beasts, compelling the pioneers to contend with them for the possession of the wilderness. At one time a bounty of sixty dollars per head was paid for wolf scalps. The wildcats have bequeathed their name to the valley running south from Mount View Cemetery. The early settlers had thrilling experiences with panthers, bears and other wild animals.* The young settlement was a lumber mart, and grew steadily with the years. In its thirtieth year there were more than 300,000,000 feet of lumber rafted down the river. In 1889 the last raft of logs was sent down from Olean and points north of it.

*Note: Early History of Concord, Briggs.

Emigrants who had heard the call of "Westward Ho!" came overland to Olean Point. This was the starting place for the West for emigrants from the East. There was on the banks of the river every year a great encampment of an emigrant army awaiting the breaking up of the ice in the river. During one springtime two thousand people waited here for the river to reach its flood stage, that they might make their way in flat-bottomed boats or on rafts of lumber to Pittsburgh, and from thence to more western points. We can picture the excitement caused by this influx of a transient population crowding into the village, being taken into the homes of the residents, camping in tents or rude shanties, or patronizing the tavern kept by Jehiel Boardman. By this route came General Putnam and companions from Massachusetts; they were the pioneers of Marietta, the first settlement in Ohio. It then seemed probable that Major Hoops' expectations as to Olean's future were to be realized. A more advantageous route for emigration, however, was furnished by the opening of the Erie Canal in 1825. Congress ordered a survey made by Major George W. Hughes in 1837, who reported that the steamboat Newcastle had ascended without difficulty from Pittsburgh to Olean, and could "even under present circumstances make regular trips between these places." But the Erie Canal had

changed the direction of trade and emigration, and nothing further was done by government or individuals for the navigation of the Alleghany River as far as Olean. To connect this part of the state with the Erie Canal, the Genesee Valley Canal was cut through from Lake Ontario; the work having been begun in 1836, was completed twenty years later. The canal extended through Olean and seven miles beyond, terminating at Millport. In connection with the subject of river navigation, it is encouraging that in the year 1919 Olean was visited by men from Pittsburgh with a view to the reestablishment of such an enterprise, by the building of dams to provide slack water. Let us hope that the vision of Adam Hoops in the early years of the past century may yet be realized and that our river banks may be lined with docks and manufacturing plants made possible by water navigation.

At this period the stage roads afforded a slow method of travel. One is impressed with the vital relation between a community and its transportation facilities by reading the statement that the most important event in the history of Olean was the completion in 1851 of an iron road—the Erie railroad. Yet, owing to lack of co-operation between the road builders and the land owners, the railroad station was placed a mile and a quarter from the village. Mention must be

made of another railroad which was not on the authorized maps. There was a station at Olean of the "underground railroad" which was in operation previous to the Civil War. At this station, fathered by Lambert Whitney, a "Doctor of the Old School," runaway negro slaves who were fleeing to Canada were cared for as they passed through, and given directions for their next stopping place. Their flight was at night and they followed the North Star. Aunt Sarah Johnson when a young girl was the first escaped slave to locate here permanently.*

Adam Hoops donated land for the schools, the park (Lincoln) and the cemetery, (Oak Hill Park.) In mapping out the town, he planned a patriotic memorial. He gave the central thoroughfares the names of Union, State, North and South, and to the others the names of Revolutionary patriots: Washington, Hamilton, Laurens, Putnam, Henley, Irving, Green, Sullivan, Wayne, Jay, Tompkins, Barry, Clinton and Fulton. Possibly Reed and Coleman were among the original names.

A CENTURY PASSED.

In 1904, a boulder of conglomerate brought from the near-by hills was placed in Lincoln Park by the Olean Chapter,

*Note: Sarah Johnson's story, "North to Freedom," in High School Congress, November, 1901.

Daughters of the American Revolution. At the centennial anniversary of the city, this monument was dedicated with elaborate and appropriate ceremonies to the memory of Major Hoops and to every Revolutionary soldier in the county.

“And the rocks shall raise their heads
Of the patriots’ deeds to tell.”

Olean is in Cattaraugus County, seventy-one miles southeast of Buffalo, and is located on the Erie, the Pennsylvania, and the Pittsburgh, Shawmut and Northern railroads. The Western New York and Pennsylvania Traction Company operates the city trolley systems of Olean, Bradford and Salamanca, and also has lines radiating to the outlying towns. Banking facilities are secured through the First National Bank, the Exchange National Bank and the Olean Trust Company. The lumber, oil, tanning and railroad industries combined with the use of natural gas and excellent transportation facilities have been the chief factors in the development of the city. The two car shops of the Pennsylvania Railroad Company employ a large number of men, and are of great importance to the business interests of the city. Olean is noted for its oil, leather and chemical plant interests. It is the terminal for several crude oil pipe lines, and has an oil tank farm of over one hundred acres in extent. The capacity of

each tank is thirty-five thousand barrels. From 1884 until the present time, the Standard Oil Company has maintained this storage place for crude petroleum in connection with its extensive refineries. The Vacuum Oil Company does an enormous business in oil and its by-products. In addition to the above industrial establishments, there are tanneries, planing mills, carriage and wagon works, foundries, ice plants, brickyards, machine shops, tile and cutlery works. There is an electric light and power company, a glass factory, silk mill, hydraulic cider and vinegar plant, bean and canning companies and a box factory.

The commercial houses are remarkably well equipped for wholesale and retail trade and have an extensive patronage from the surrounding towns, farm and oil producing districts. Affiliated with the Trade and Labor Council are many strong labor unions.

The churches number twenty-two; there are Young Men's Christian Association and Knights of Columbus buildings, the Olean Public Library, Higgins Memorial Hospital and Nurses' Home, the Clinic, a state armory, high school and nine grade school buildings, St. Mary's parochial school and convent, the parochial school of the Transfiguration, and Westbrooks Commercial College. St. Bonaventure's College and St. Elizabeth's Convent are at Alleghany, two

miles west of the city. The parks include Oak Hill, Lincoln, several small breathing places, and an important addition to its park lands made by the city in 1918-1919. The Chamber of Commerce inaugurated and pushed to completion a flood abatement project at an expenditure of \$350,000, the expense being shared equally by the state and the municipality. Without a loss of waterways, fifty acres of park lands and several miles of boulevards have been added to the city. The Chamber of Commerce has been instrumental in bringing many manufacturing plants to the city. The Business Men's Association is another strong factor in promoting business interests. Conspicuous organizations are the City and the Hamilton Country clubs, the Elks, the Moose, and several strong Masonic orders. *The Evening Herald* and *The Evening Times* are fine newspapers, both having daily telegraphic news service. There are attractive theatres and motion picture houses. In addition to many organizations, religious and fraternal, which are doing welfare work, may be mentioned the Red Cross, Anti-Tuberculosis, Visiting Nurse, Infant Welfare, Womans Christian Temperance Union, Woman's Civic Club, Daughters of the American Revolution, City Relief, Children's Aid, and Single Tax League. Vacant Lot Garden cultivation was in operation in 1911-1913, and in 1917-1919, the Chamber

of Commerce conducted War Gardens on a large scale. In 1918 the Land Army of America was organized.

Further interesting facts regarding Olean are as follows: a city charter was granted in 1893; its fire department is motorized; the gravity system of water works is owned and operated by the city; a filtration plant has been installed in North Olean; the census of 1915 showed a population of 17,925; the slogan of the Chamber of Commerce is, Olean Offers Opportunities. This last attractive statement suggests a reminiscence of forty years ago, when Bradford and Olean were friendly rivals in bidding for the influx of population brought by the near-by oil developments. Each city insisted that it had a greater number of natural advantages. Regarding the extraordinary natural resources dwelt upon in the introduction to the sketch of Bradford given in this booklet, the story may be read as equally applicable to the history of Olean. These two progressive young cities, so well endowed with *natural* advantages, may well emulate one another, as at present, in showing which may offer the more *acquired* advantages.*

*Note: See Appendix.

HISTORIC GLIMPSES OF BRADFORD, PENNSYLVANIA.

IT is indeed amazing to consider the fabulous wealth represented in the natural resources which were placed at the disposal of man in the land at the head waters of the Alleghany river. The most lavish gifts have there been found in the great storehouse of Mother Earth. In 1839, one of the first geologists to visit this part of the country reported as follows: "The valleys of the Alleghany and its tributaries are distinguished for their magnificent forests of white pine. Probably no region in any of the states was originally covered with an equal amount of valuable timber." As the years have passed it has been realized that the world has never seen the like of these stately *white pine* forests, which furnished timber superior even to that of Washington or of "the woods where rolls the Oregon." For years mighty rafts of lumber were taken down the river and used in building operations in all the states bordering the Alleghany, the Ohio, and Mississippi rivers. Rafting continued for more than two generations and yet untold wealth in timber lands remains. The forests yielded and continued to yield of their treasures for manufacturing purposes, for the tanning of

leather, and for the production of wood alcohol, acids, and alkalies.

In the forests were countless numbers of wild creatures in furs and in feathers. The hunting and trapping of fur-bearing animals has been for more than a century a business of great importance. Regarding the birds, one instance must suffice. Year after year the flocks of wild pigeons came to their breeding places on the river in such vast numbers that for days the sky was darkened as with heavy clouds. By brutal and indiscriminate slaughter the species has been nearly exterminated.* The streams were filled with an abundant supply of the choicest fish. The hills gave of their rocky treasures and of materials for brick, mortar, and glass. The earth's crust was pierced, and there was found a subterranean ocean of petroleum, 800,000,000 barrels of which have already been brought to the surface, founding an industry which has produced a new era in the world's history. With its marvelous by-products, petroleum comprises wealth almost beyond our comprehension. Later came the utilization of gasoline, of natural gas, and from it more gasoline. In this richly endowed portion of the globe there was also not lacking the fertile soil necessary to the production of food, clothing, and the raising of livestock.

*See *Birds of New York* by Elon Howard Eaton.

To the frontier physician, Dr. Bennett, belongs the distinction of making in 1828, the first home in the future city of Bradford. He practiced his profession in the lumber camps and valley settlements. In 1837 the United States Land Company owned a quarter of a million of acres of timber lands in this vicinity. Representing the company, Colonel L. C. Little established a hamlet named Littleton on the Tunungwant or Crooked Creek, and lumbering became the great business for many years. In 1858 Littleton adopted the name of Bradford, the reason therefor not being clear; possibly the place was named in honor of William Bradford, attorney general for Pennsylvania, and also a member of Washington's cabinet. In August, 1871, the Barnsdall, the Independent and the Salem oil companies were organized in Bradford for the purpose of drilling for oil in the vicinity of the village. The first oil well was completed in 1874, and within two years there were four thousand producing wells on Tunungwant Creek, which became famous as the center of the Bradford Oil District, one of the greatest oil producing regions of the world.* Manufacturers followed the oil producer, Bradford grew rapidly in size and commercial importance, and was granted a city charter in 1879.

*Note: "Bradford Oil District," in this volume.

Bradford is in McKean County, Pennsylvania, seventy-eight miles southeast of Buffalo, on the Erie, the Pennsylvania, and the Buffalo, Rochester and Pittsburgh railroads. It also has service from the Western, New York and Pennsylvania Traction Company. Kinzua Bridge, fourteen miles distant, is three hundred feet high, twenty-one hundred feet long, and spans a wooded valley.

Noteworthy features of the city are its twenty-six churches, high school, and five ward school buildings. St. Bernard's parochial school, Young Men's Christian Association, Knights of Columbus, Young Women's Christian League, the Northwestern Anti-Tuberculosis League, the Carnegie Public Library, the Historical, the Red Cross, and the Humane societies. A visiting nurse is supported by the Visiting Nurse Association. The city has reason for especial pride in its progressive public market, in its completely motorized fire department, in its hospital having one hundred and eighteen beds, and the English cottage plan, and in the new Hamsher home for nurses. Other notable organizations are the Bradford and the Country clubs, the Elks and the Moose, the Masonic orders, the Woman's Literary Club, the Business Men's Association, and the Board of Commerce. Play grounds and juvenile garden work with paid supervision were inaugurated by

the Board of Commerce and taken over and carried on by the Board of Education. The labor unions have large and strong organizations. The banks are the Bradford National Bank, the First National Bank, and a third the name of which is not available at this writing. The newspapers are: *The Era*, *The Star-Record*, and *The Sunday Herald*. A beautiful theatre and three moving picture houses supply the histrionic needs.

The progressive spirit of the people was indicated by the adoption of the commission form of government by act approved in 1913. The reservoir and water works are owned by the city, the gravity system having been established largely through the efforts of Rufus B. Stone. Exceedingly fortunate was the city in having forward looking citizens in the preceding generation, by whose foresight and wisdom the community was induced to purchase twelve thousand acres of water-shed. Peter T. Kennedy was one of the principal agitators for the acquisition of the watershed. The city now has excellent water at a very low rate and a large balance to the credit of the water department which can be used for municipal improvements.

Bradford has a large trade in oil, wood acid, alkalies and gasoline, extensive manufactures of oil-well tools, building and paving brick, tile, silks, boilers, gas engines, air

compressors, brushes, carbon brushes, and cutlery. Nearly every one in the community is interested financially in oil. The city contains many handsome residences and is very compactly built. Natural gas is largely used for fuel and lighting, and there is an electric light and power plant. With the operation of the new water drive method for increasing the output of oil, which, it is estimated will make the oil field productive for probably fifty years longer, certainly the commercial future of Bradford looks bright. The census of 1916 estimated the population as 15,800.

THE BRADFORD OIL DISTRICT.

AS an approach to the consideration of one of the oil regions of the world, it may be of interest to refer to a few instances of the use of petroleum in some of its forms by men from the earliest times.* The "slime," mentioned in the construction of the Tower of Babel over four thousand years ago, was doubtless partially evaporated petroleum. It is believed that the pitch with which Noah covered the Ark two hundred and fifty years earlier, was a similar product. Bitumen was used in the walls of Nineveh and Babylon, and the same substance taken from the Dead Sea was sold to the Egyptians for embalming purposes. In China natural gas was transported from place to place in bamboo pipes, and in Genoa, Italy, gas was used for illumination. Pliny records that rock oil was burned in the lamps of the Temple of Jupiter in the year 1 A. D. For twenty-five centuries the oil and gas springs about the Caspian Sea were used as holy fires. There is little doubt that petroleum was known by the aborigines on this continent centuries before the advent of the white man.

At Pithole, and on Oil Creek as it enters the Alleghany River one hundred miles

*Note: Acknowledgment is due the Derrick's Handbook of Petroleum.

north of Pittsburgh, ancient pits built of logs have been found, which were evidently made for the storage of oil. They cover hundreds of acres of land, and are seen in places where oil is found near the surface and not in any other places. The Indians were ignorant of their origin.

The earliest mention of petroleum in the United States dates back to 1627 when the oil spring at Cuba, N. Y., was described by a French missionary. In 1670, in a map made by missionaries, this same "fountain of oil" was located. In 1721 a traveler tells of a journey up the Genesee River and thence by land to the Alleghany River, then called the Ohio. Of the spring at Cuba, he said: "The savages use the oil to appease all manner of pains." In 1833, Professor Silliman of Yale College, visited the place and wrote an account of it, saying in part, "The oil is skimmed like cream from a milk pan, a flat board being used. It is cleaned by heating and straining through woollen cloth. However, most of the so-called Seneca Oil is from Oil Creek, Pennsylvania." There was also a notable oil spring at Freedom in Cattaraugus County, N. Y. In 1767 and 1789 Moravian Missionaries in Pennsylvania thus described the methods of collecting oil. "The Indians skim off the thick oil and throw it away, then stir the water, fill their kettles and purify the oil by boiling away the water. Sometimes they

make a little dam, and dip in a woolen blanket, quickly removing and wringing it. It absorbs the oil and spurns the water." This oil was sold to the white man for four guineas a quart.

From 1808 to 1815, in the drilling of shallow wells for salt and brine, petroleum was often struck, which was looked upon as a misfortune as it ruined the salt wells. About 1850 Samuel M. Kier of Pittsburgh, had been selling the oil from his salt wells for fifty cents a half pint bottle. He was quite modern in his clever advertising. A circular in the shape of a bank note explained that "Kier's Petroleum" was a "Natural Remedy procured from a well 400 feet below the Earth's surface." This circular coming to the notice of two young men suggested to them the idea of drilling for oil. In 1859 E. L. Drake, a New England Yankee, drilled near Titusville, the first wild cat well in the Pennsylvania oil regions. He was handicapped by lack of men who understood drilling and by the inefficiency of the tools then in use. Hearing of William A. Smith, he engaged him to do the work. "Fate tried to conceal him by naming him Smith," but his inventive genius joined with the ingenuity and superb faith of Drake made this historic well possible. Samuel B. Smith of Titusville, Pennsylvania, is the only man now living who helped to drill the well, and the following

is in brief his story. My father, William A. Smith of Tarentum, was a blacksmith. When the drillers of the salt wells lost their tools in the hole, my father had success in devising and making apparatus that would bring up the lost tools. These were the first "fishing" tools made. In working about the salt wells he acquired a good idea of the principles used in drilling, so that when Colonel Drake was ready to drill his oil well, he came after my father to do it. Father made the temper screw used on that well, not very different from the ones used nowadays. Oil was struck at sixty-nine feet and flowed three hundred and fifty barrels a day. William A. Smith has descendants living in Bradford and in Chipmonk. Drake had the faith to drill through the rocks in the face of ridicule and scorn. When he struck oil in the submerged Devonian strata, the industrial world entered upon a new era furnished with fuel, light, and tremendous power which had been stored in by-gone ages.

THE DRAKE MEMORIAL ASSOCIATION.

A Drake Memorial Association, which meets annually, has been formed with E. C. Bell of Titusville, as secretary. He is also the collector and curator of a complete museum of documents, tools, and other historical relics of the early days of the oil de-

velopment. Fifty years were spent in making the collection.

In 1871 Job Moses was successful in finding oil at Limestone, New York, in the same year drilling began on Tunungwant Creek near Bradford, in 1874 the first well was completed, and the famous Bradford Oil District was an established fact. The developments in Alleghany County, New York are included in the Bradford District, which is classed with the Appalachian Field. The latter extends from New York to Tennessee and has a width of one hundred and fifty miles. The wells in this field range in depth from a few hundred, to four thousand feet. In the Bradford District the oil bearing sand is found at a depth of from thirteen hundred to eighteen hundred feet, and is so regular and constant that if wells were drilled at random, the number of dry holes which would be obtained would hardly exceed two in every one hundred. This estimate was made in 1916, and since then the high price paid for oil has greatly stimulated drilling in previously developed territory. The Bradford sand is thirty-five feet in thickness and remarkably long-lived. There has been no sand like it in the length of time it has continued to produce, wells drilled forty years ago are still producing oil in paying quantities. Oil sands are considered to be reservoirs or sponges which serve to hold oil. A fair average is given

in 1918 of the production for the entire Bradford District as a quarter of a barrel per well per day. Economy in pumping the smaller wells is secured through using an ingenious system of compressors and jerk lines. The compressor, a central power station, is connected with a large number of wells by the jerk line, which consists of a series of connecting rods, supported on tripods. The rods are jerked backward and forward by the compressor, thus pumping the wells. The general effect is that of rail fences extending across hills and valleys. The flowing wells are those in which the pressure of the natural gas forces up the petroleum; in the pumping wells the gas is weak or exhausted.

It was estimated by the government in 1918 that 85 per cent of the recoverable oil in the Bradford District had been exhausted. The opinion of the operators in the district is quite different. They consider that 50 per cent of it is still in the ground and they are going after it. One of the new methods employed to increase production is the flooding or water drive method. This flood production has rejuvenated the field; it is claimed that it will make it good for at least fifty years longer. The method is to clean out an existing oil well and flood it with water. The great water pressure gradually drives the oil before it in a constantly enlarging circumference. The

radial travel is about seven feet per annum. The water backs the oil up in front of it, and the idea is to drill into this bank of accumulated oil. It follows that this method of production compels the producer to drill frequently and closely and in an ever increasing circle. By this method the producer claims to be able to get practically all of the oil in the ground.

The oils of the Appalachian Field are in the main of a high grade paraffine base, free from asphalt and objectionable sulphur, and when refined, yield superior gasoline and illuminating oil.

The following figures are all approximate. They were compiled in 1918 and I have condensed them from many pages of government reports.

The total yield of petroleum in the Bradford District in the sixty years of its existence has been 788,500,000 barrels. In 1891 the peak of production was reached, amounting to 33,000,000 barrels.

Of the world's total yield of 6,500,000,000 barrels, two-thirds has been produced by the United States. Of the United States' yield of 4,000,000,000 barrels, nearly one-third has been produced by the Appalachian Field. Of the Appalachian's Field's yield of 1,217,000,000 barrels, more than one-half has been produced by the Bradford District. The approximate value of the total production of the Appalachian Field,

estimated as sold at the wells is \$1,682,000,000. The value of the natural gas produced in the eighteen years ending in 1916 was \$352,133,000, and the value of gasoline produced from natural gas was \$1,726,000.

With regard to the importance of the petroleum industry, J. D. Northrup writes as follows: "Peculiar interest attaches to the production of petroleum in Pennsylvania as a consequence of the fact that the petroleum industry of the United States had its inception in this state, and of the further fact that its first oil pools are still contributing to the oil supply of the country. Since the discovery of these pools, the United States has maintained supremacy in the petroleum industry of the entire world. The United States produces, refines, and markets two-thirds of the world's current supply of petroleum. Such a condition is of vast importance in time of peace, but takes on an interest that becomes world-wide and vital when the relation of petroleum to the conduct of modern warfare is fully appreciated."

Tracing the development of the petroleum industry from the time Colonel Drake's well came in down to the present day, we learn of the origin of the refining processes through the researches of James Young in England in 1850, of the invention of the kerosene lamp by Samuel Kier in Pittsburgh in 1852, and the consequent revolu-

tion brought about in the illumination of homes, work shops, and streets, of the development of the gasoline motor, and the culmination of the services of petroleum in making possible the winning of the war by the Allies.

We may well inquire as to what science has learned of the process of the manufacture of such valuable materials in the laboratory of the earth. A recent number of *Current Events* says: Geologists disagree as to the origin of petroleum. The majority of those who have written on the subject appear to believe that the oil is of animal and vegetable origin. It is conjectured to be mainly the fat of fishes, reptiles and animals that lived and died ages ago. Oil-bearing plants or seeds may have contributed to the total supply. The whole subject is wrapped in mystery.

The theory of those who believe that petroleum is largely from vegetable remains is here given. In the storehouse of nature it took inconceivably long ages of time to manufacture the coal, petroleum, natural gas and other carbonaceous products. They are largely vegetable remains, having been subjected to pressure of materials above them, which pressure caused heat sufficient for distillation. The petroleum is believed to have been formed from marine plants as coal was derived from land plants. The basin for the reception and preservation of

coal is underneath it—the hard conglomerate rock; the basin for the pool of oil is above it—an impervious rock or bed of clay over it is a necessary condition, as the oil rises on water and from gas pressure. When the drill pierces the hard cap of rock overlying the pool, the oil is often forced up by the tremendous pressure of natural gas.

NATURAL GAS AND GASOLINE.

New York has the distinction of being the first state to recognize the utility of natural gas and to make use of it for fuel and illumination. In 1821 gas was first obtained from a well one and a half inches in diameter and twenty-seven feet in depth, put down in Fredonia, Chautauqua county, and was used for heat and light at that time. The hotel was illuminated by it when General Lafayette visited Fredonia. However, the development of the natural gas industry has taken place for the most part in the past eighteen years. The value of the annual production of natural gas in New York state is in excess of \$2,000,000. It is produced in sixteen counties, the number of wells in 1916 being 2,068. The average house uses 25,000 cubic feet of gas per month.

The gas fields of Pennsylvania are essentially coincident with its oil fields. They are distributed over twenty-three counties. The principal gas sands number more than

a score. The value of gas produced in the eighteen years from 1898 to 1916 was, in Pennsylvania \$329,039,369, in New York \$23,094,169, a total of \$352,133,538.

The market value of natural gas commercially utilized in the entire United States in the year 1916 was \$120,227,468.

There is a steady decline in both production and pressure. At the end of 1916 there were 13,917 gas wells in service in Pennsylvania, exclusive of a great number of other wells which produce both gas and oil. Gas obtained from oil wells is called casing-head gas, or wet gas. This gas also contains gasoline vapor. It was formerly allowed to waste in large quantities. For many years throughout the oil country, the enormous flames of gas burned night and day. The removal of the gasoline from the gas leaves a drier gas, with little loss of fuel value. Beginning with 1919 gas well pressure records are to be kept.

The gasoline produced from natural gas in Pennsylvania in 1916 was valued at the 195 plants at \$1,726,000. In New York there were in 1916 two plants in Alleghany county, and three in Cattaraugus county. This industry represents true conservation in that it has brought about the saving of oil-well gas that was formerly wasted because the volume obtainable from individual wells was not sufficient to warrant the expense of collecting and piping it to market.

There has been also a gain in the quality and heating power of the gas from which the gasoline has been taken, and the gasoline is made available for the ever increasing demand for motor fuel.

The idea of a Community Grove similar to that advocated in 1920 on the following page [51], took visible form in 1922 in Allegany State Park in Cattaraugus County, New York.

The undersigned suggested such a grove as a World War Memorial in this park. The Hon. A. J. Faucher, chairman of the State Commission and the other members of the Commission endorsed the plan and secured the cooperation of the State Forestry Department. The first planting and grafting* of trees was done in April 1922 in beautiful Quaker Run Valley.

Efforts are being made to introduce nut culture on the Appalachian Mountain farms
Katherine Eaton Bradley
April 1922.

* Nut Growing. Morris. MacMillan Co

APPENDIX.

A SUGGESTION FOR A MUNICIPAL GROVE OF FRUIT AND NUT-BEARING TREES.

One of the ancient villages of Europe has had a community forest in successful operation for five hundred years, the revenue from it paying the expenses of government, thus relieving the villagers of all taxes. Our foresters point out that France could not have resisted the German invasion without her carefully tended forests. In horticulture this country can learn much from the older communities. As we look upon the hills about Bradford and Olean, we know that students of forestry advocate their reafforestation, which, aside from the added commercial value, would be health-giving to the community and also furnish an asset of picturesque beauty.

The plan herein outlined in a tentative way is, however, for a community fruit and nut grove. As to its feasibility, I questioned a Rochester nurseryman of national reputation and a well-known civic worker of Bradford. The former, replying to various questions, said that with proper co-operation and management such a grove would be self-supporting in a few years; fruit and nut trees would thrive on level and slightly sloping ground; steeper hillside

could be utilized for berry bushes, grape vines, and the keeping of bees.* Some of the expenses of spraying and caring for the trees while coming into bearing could be met from the sale of honey; the bees also giving service in the fertilization of the tree blossoms. The civic worker gave the following opinion: "With competent municipal supervision, a community fruit and nut grove should be feasible, more successful perhaps than such an enterprise in or near a city under private ownership, because better guarded. I have long looked forward to the time when the Great Level should become an immense grove of nut-bearing trees, and I think public attention cannot be too strongly directed that way."

As our municipalities might hesitate at the present time to incur the expense of buying land, planting and fencing a grove, its establishment would probably depend on civic organizations, or on the gift of public-spirited citizens. Such a grove could be a memorial, its name and those of its donors being registered with the American Forestry Association.

Let the mind picture the beauty of an orchard of "trees pleasant to the sight and good for food," friendly trees clapping their hands with joy, scattering abroad the delicious fragrance of their blossoms, and at the harvest time laden with richly colored fruit. Dwell for a moment upon the great

variety of fruit trees, especially of that royal fruit, the apple; and as to nut trees, there are the chestnuts, walnuts, hickory and beechnuts, butternuts and hazel-nuts. There could be berry bushes, and there should be long hedges of the elderberry, and trellises of grape vines. The people of the country districts are able to supply themselves with elderberries for winter use, but city dwellers cannot get an abundance of this valuable fruit, which requires little sugar to combine it with apples, grapes and with many fruit juices.

Some cities now employ a forester to look after their ornamental trees. Perhaps such an official, understanding orchard and bee culture, could have charge of the grove, and live on the place. In the winter time, he might render much needed leadership in organizing volunteers to go into the woods during heavy snowfalls to feed our feathered friends. The forester might be assisted in his orchard work by volunteer groups of citizens or of supervised school children. An educational campaign is now starting at Cambridge, Massachusetts, to teach children how to raise bees and make a profit. The student's hives are kept in city back yards. Each swarm of Italian bees will produce an average of one hundred and twenty-five pounds of honey, which now sells at forty-five cents a pound.

The Italian bees produce the most honey with the least sting.

As to the profit in fruit raising, we read that the largest apple orchard in the world, owned by A. R. Clay of White Hall, Illinois, covers 1,200 acres, and that the acreage is being increased. One can foresee that at times the ground would be carpeted with fruit and nuts, and that under necessary regulations groups of children could be admitted. After the choicest produce had been sold to provide for self-support, there would remain an abundance of the less desirable which citizens could gather for their own use. Persons could work in the grove, receiving credit for hours worked, and use their credits for buying produce.

When the orchard shows a profit, various ways will suggest themselves to the mind as to a fair distribution to the community. The profit might be used to pay the salary of a recreational secretary, or for other welfare work; the tax budget might be reduced; or it could be applied, as is now done with the surplus in the water department of the city of Bradford, in making municipal improvements.

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